Quality Control of a climate change ensemble simulation over Europe with the regional climate model COSMO-CLM

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The concept and selected results of quality control of an ensemble of regional climate-change simulations over the time period 1960-2100 over Europe (5000×4500 km^2$, $\Delta x=\Delta y=0.165^\circ$) with the non-hydrostatic model COSMO-CLM will be presented. The model quality and the quality of the climate change signal are in the center of consideration.

The "COSMO model in Climate Mode" (COSMO-CLM), also known as the CLM, is a unified nonhydrostatic model for operational weather forecast (investigated by COSMO) and for regional climate simulations (investigated by the CLM-Community). The regional model has been forced with the present day climate (C20 control runs) and A1B and B1 scenario runs of the ECHAM5/MPIOM global climate model of the Max Planck Institute for Meteorology, which contributed to the fourth climate assessment report of the International Panel on Climate Change (IPCC).

The quality of the regional climate model is estimated from a comparison of the evaluation run (with ERA40 as boundary conditions) with different observations. The uncertainty of the climate change signal of the precipitation is derived from a systematic intercomparison of the simulation results for different ensemble members and time periods with each other, with the global model and with the evaluation run. The uncertainties are quantified by a set of statistical measures, which have been calculated for different regions covering the model domain.

The quality control allows conclusions about the internal variability of the simulated

climate on different time scales and gives a quantitative estimate of the quality of the regional model and of the regional climate change signal on different time scales, for different regions and variables.

The limits of transferability of the results obtained for one simulation, region, variable or time period will be illustrated and the relevance of the investigation for model analysis will be discussed.